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November-December 1984



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COVER: CDR Samuel Bookatz, USNR (Ret.), a prominent Washington, DC, artist, inspects the portrait he painted during World War II of RADM P.S. Rossiter, former Surgeon General of the Navy. Story on page 14. Photo by the Editor.

I Knew You Were Good

Almost daily, I receive letters citing members of our Navy Medical Department for their accomplishments in a wide variety of areas. Further, in visits to our commands and facilities, I have had ample opportunity to confirm your achievements by seeing firsthand the initiatives many of you have made in expanding the scope of your professionalism. The simple fact is—you are good. To prove my point let me share with all of you just some of your accomplishments—accomplishments shared by every corps in our community.

Last year members of our Medical Department published over 600 professional papers in national medical, dental, nursing, and management journals. In addition to published papers, our physicians, dentists, administrators, allied scientists, and nurses made over 700 presentations to a wide variety of audiences including professional groups and universities. Our personnel participated in over 300 professional meetings and seminars. Over 140 of our officers were honored and recognized by appointments as instructors and professors in many of the most prestigious schools in the country. Three hundred fifty of our physicians and dentists gained board certification in their respective specialties for the first time. Over 75 of our officers earned doctorates, masters, or

bachelors degrees in a wide variety of fields.

Our participation in community activities was no less significant. I know of at least 125 presentations made to community groups such as service clubs and schools by our personnel. At least eight of our officer and enlisted personnel were recognized by awards from the Navy League. Some of our athletes were sufficiently outstanding in their sport to make the Olympic trials.

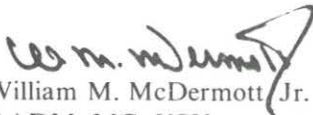
The accomplishments of our enlisted men and women is worthy of special mention. I know of 60 men and women who have completed their baccalaureate degrees during the past year and another 50 who earned their associates degree. Ten of our outstanding personnel earned masters degrees during the past year.

Our enlisted men and women have been no less active in the community, with at least 50 presentations having been made to schools and other community groups. We have always realized the quality of these men and women, but not this: Eight professional articles published, 120 new professional certifications, 11 professional licensures, and 12 new registry memberships—all in one year!

This list could go on and on. I know my sample has captured only a small part of all that you have done, in addi-



tion to caring for our patients in a manner that gets better every day. The accomplishments which I have listed are only a further reflection of the wealth of talent which you possess and demonstrate every day in the service of our Navy. As I have said every day, I knew you were good. Your record stands for anyone to challenge.


William M. McDermott Jr.
RADM, MC, USN



Base 504916 (547180) 2-82

Medical Civic Action Mission to Guatemala

During February 1984, 15 military medical personnel participated in a civic action mission to Guatemala, Central America.

Our Military Airlift Command flight set the tone for the entire trip. Combined with the tropical temperature and humidity, the air from the C-130's ducts condensed and formed an eerie fog inside the plane. Four infectious disease specialists, three

family practitioners, two pediatricians, two dermatologists, one pathologist, a parasitologist, a hospital corpsman, and a medical student sat together idly joking and anticipating the 1-week excursion. Other field trips were limited to Panama, and the only physically demanding experience was a jungle operation training course.

We arrived in Guatemala City toward noon. Volcanoes and mountains surrounded this cosmopolitan city of "Eternal Spring." However, from the beginning, this apparent equanimity was tempered by the pres-

ence of security guards that also surrounded us. We were taken to the U.S. Embassy where we received a briefing about the ongoing guerrilla war and the areas we would be visiting. One of these areas was named Quiche, a name that previously evoked images of spinach pie; now it represents a mountain province where many refugees live with few, if any, possessions.

Infrequently, national health care workers go into the battle zones. Rarely are medical supplies, diagnostic equipment, or immunizations provided to the suffering refugees.

NOTE: Beginning with the 1985 appropriation, Congress no longer authorizes funding of these missions.

Typical refugee housing



At 0700 the next day we flew to Nebaj. Thereafter, each day we would visit a refugee camp or nearby village. We set up shop early in the morning and saw patients until dusk, when the failing light brought an end to the day's activities.

Names like Tzalbal, Chajul, and Cotzal became etched in my mind. The native Indians were ecstatic to see us. Complete villages turned out for examinations. From information received in earlier lectures we expected to confront some exotic diseases and came prepared with a microscope, stethoscopes, penicillins, sulfas, erythromycin, metronidazole, piperazine, aspirin, multivitamins, and a few other supplies.

What we faced daily were long lines of beautifully dressed natives. These descendants of the Mayans speak their own language and have a culture very different from Spanish Guatemala. From a distance they were lovely; up close there was ample evidence of suffering and illness. Malnutrition was shocking, and the underlying debility and advanced disease depressed us all.

Sanitation is either poor or absent. Parasitism and dysentery are commonplace. Overcrowded living conditions and impoverishment were accompanied by rampant tuberculosis. The limited native diet of beans and corn tortillas inadvertently fed ascarids and hookworms, as well as their hosts. Many viral and bacterial diseases probably pass through the villages periodically, leaving many dead behind. Children with the sequelae of measles and other infections abound.

There are no true statistics to quantify the astounding morbidity/mortality. Some of our patients, who would not live another week, were dying simply from malnutrition. Others would lose or have already lost their sight or other faculties because they could not afford transportation to a hospital.

Civic action is a unique form of aid. It directly benefits those who receive the aid, especially when it elevates the standard of living and teaches people how to help themselves. This program



An entire village turns out for examinations.



One child suffers with a pellagrous rash, another with marasmus.

proves to be a very effective means of providing a positive service in a peaceful manner while instilling a favorable image of the United States.

As brief visitors to the refugee camps and villages, we could do little to achieve a long-lasting impact upon the health of the occupants. However,

the refugees know that the United States sent physicians and medicines to help them. And we certainly made many friends. □

Story and photos by L. I. Scott H. Isaacman, MC, Clinical Investigation Department, Naval Hospital, San Diego, CA.

Preventive Medicine Quiz

1. Which of the following conditions is (are) associated with an increased incidence of tuberculosis?

- (A) Siderosis
- (B) Asbestosis
- (C) Silicosis
- (D) Cigarette smoking

2. Which of the following viruses do NOT cause aseptic meningitis?

- (A) Coxsackie A
- (B) Coxsackie B
- (C) Rhinovirus
- (D) Echo virus

3. Histoplasmosis is transmitted by which of the following agents?

- (A) Birds
- (B) Farm animals
- (C) Rats
- (D) Rabbits

4. The known transmission cycle for eastern equine encephalitis is:

- (A) Man --> mosquito --> horse --> birds --> man
- (B) Horse --> mosquito --> man --> birds
- (C) Mosquito --> birds --> mosquito --> man
- (D) Birds --> mosquito --> horse --> mosquito --> man

5. In which of the following is inspection of meat not a practical method of detecting disease?

- (A) *Tinea solium*
- (B) *Tinea saginata*
- (C) *Echinococcus granulosa*
- (D) *Trichinella spirillum*

6. Irrigation canals in developing countries contribute to an increase in the incidence of which of the following?

- (A) Dengue
- (B) Cholera
- (C) Infectious hepatitis
- (D) Schistosomiasis

7. Stool cultures from malnourished children in developing countries are most likely to reveal which of the following?

- (A) *Salmonella*
- (B) *Shigella*
- (C) Enteric viruses
- (D) Amebiasis
- (E) No viral or bacterial pathogens

8. What is the best advice a physician could give families living in a hookworm endemic area?

- (A) Don't swim in polluted water.
- (B) Cook meat thoroughly before eating.
- (C) Wear shoes.
- (D) Always boil water for at least 5 minutes before drinking.

9. Which of the following is the most likely diagnosis in a serviceman returning from Southeast Asia who develops a rash, lymphadenopathy, and spiking intermittent fevers?

- (A) *Falciparum malaria*
- (B) Louse-borne relapsing fever
- (C) Dengue fever
- (D) Scrub typhus

10. Concerning typhoid fever:

- (A) It is transmitted by food or water contaminated with the excreta of an infected person or carrier.
- (B) Strict surveillance of carriers has contributed to its decline in the United States.
- (C) Public health measures such as the chlorination of water have contributed to its decline in the United States.
- (D) All of the above.

References

Last JM (ed): *Maxcy-Rosenau: Public Health and Preventive Medicine*, ed 11. New York, Appleton-Century-Crofts, 1980. □

(Answers on page 29)

The Medical Command LMET Course

LCDR James M. LaRocco, MSC, USN

A previous article⁽¹⁾ described the Medical Department's effort to develop a series of Leadership and Management Education and Training (LMET) courses. Phase I, involving a course primarily aimed at commanding officers and prospective commanding officers of health care facilities, is now complete. The first two Medical Command LMET courses have been presented at the Naval School of Health Sciences, Bethesda, MD. This article describes the competency model developed for the course and the content and approach used in presenting course material.

Competency Model Development

To review briefly, a series of expert panels consisting of Medical Department flag officers and commanding officers met with McBer and Company representatives (contractors for the LMET program) to identify (1) the characteristics and skills (competencies) that distinguish outstanding from average commanding officers, and (2) the major job-related tasks facing

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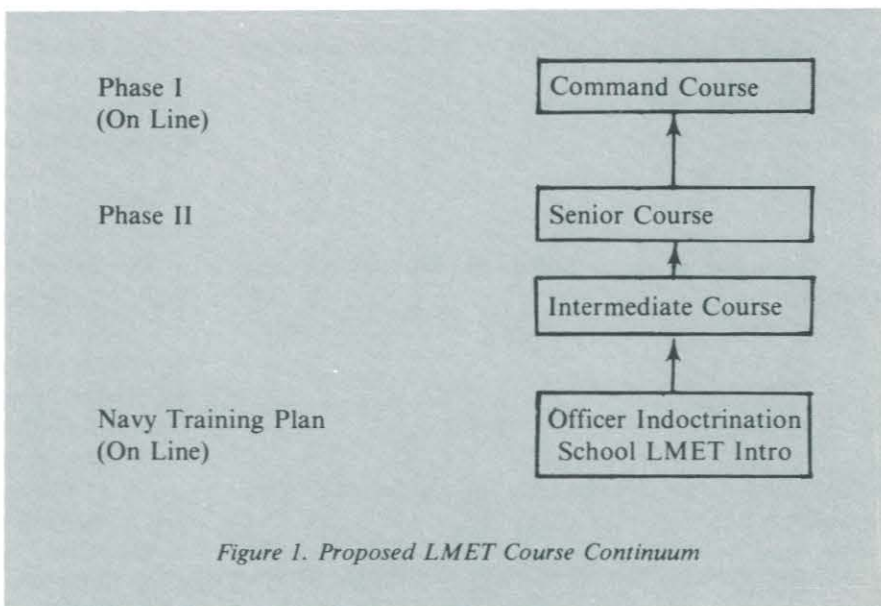


Figure 1. Proposed LMET Course Continuum

commanding officers of health care facilities. The panel members also reviewed a list of current and recent CO's and identified (1) those they knew and (2) of those they knew, the ones they considered truly outstanding.

From an analysis of the expert panel data, a personal characteristics inventory and a job task inventory were created. These inventories, along with the list of CO's, were sent to all current CO's in the Medical Department. The CO's then ranked the personal characteristics and job tasks in order of

importance and, in the same manner as the expert panel members, identified the CO's they considered outstanding.

This information was sent directly to McBer. Two distinct groups were then identified: (1) a criterion group of commanding officers who were doing or had done an outstanding job and (2) a comparison group of commanding officers who were not nominated as doing an exceptional job. Keep in mind that even those in the latter group were performing well. The distinction McBer was trying to draw was

between good and exceptional. The criterion for being assigned to a group included being known by at least five other commanding officers. In addition, to be assigned to the outstanding group, one had to be identified as outstanding by at least 60 percent of those who indicated they knew him or her. In this way 31 CO's, 20 designated as outstanding, were selected for individual interviewing. McBer then interviewed the 31 CO's, as well as 17 flag officers, using a specific technique called the Behavioral Event Interview (BEI). These data were analyzed and a competency model developed.(2)

Fifteen key competencies evolved. These, in turn, were arranged into five competency clusters (Table 1) reflecting the important behaviors and characteristics that outstanding Medical Department commanding officers apply in their jobs. Note that the model contains two levels of competencies: (1) criterion competencies that were displayed significantly more often by the group of outstanding CO's and (2) threshold competencies that are crucial to successful command and were employed by both groups of commanding officers. The inclusion of both levels reflects that even the average commanding officers were high performers and displayed some of the same competencies that the outstanding CO's showed.

Keep in mind, while reviewing Table 1, that these are not simply things people say are important. The competencies were developed from examples of behaviors that were performed. Thus, attention to patient satisfaction or support to the fleet did not become part of the competency model because several individuals said they were important. These competencies, like the others, were derived from exam-

TABLE 1. Outline of the Competency Model for Medical Department Commanding Officer*

Concern for Service Quality Cluster

1. Attention to Patient Satisfaction*

Behavioral Indicators:

- Reads and responds to letters of complaint.
- Speaks to patients to monitor satisfaction.
- Utilizes patient-satisfaction surveys.
- Has explicit policy statement about being courteous to patients.

2. Concern for Others in the Command**

Behavioral Indicators:

- Takes steps to demonstrate concern for staff.
- Acts to respond to staff needs.
- Anticipates the needs of staff.

Performance of Command Cluster

3. Commitment to Improvement†

Behavioral Indicators:

- Identifies discrepancies between ideal and existing states.
- Plans action steps to accomplish goals.
- Identifies obstacles and develops contingency plans to deal with them.

4. Sets Clear Performance Goals and Objectives**

Behavioral Indicators:

- Specifies particular outcomes being sought.
- Specifies time frame for accomplishments.
- Sets expectations for subordinates' performance.
- Sets and maintains standards of performance for staff.

5. Efficiency†

Behavioral Indicators:

- Recommends more efficient use of manpower.
- Plans for maximum efficiency and productivity.
- Takes action to maximize use of time, space, and other resources.
- Acts to optimize job-person match.
- Gives subordinates authority and other resources to accomplish stated goals.

*Adapted from Excellence in Navy Medical Department Leadership and Management, McBer & Co, 1984.

**Critical competency

†Threshold competency

TABLE 1 (con.)

6. Monitors Performance Against Standards†

Behavioral Indicators:

- Monitors individual performance.
- Monitors command performance (i.e., productivity indices).
- Keeps track of professional credentials.

7. Gives Performance Feedback**

Behavioral Indicators:

- Confronts others about inadequate or unsatisfactory performance or behavior.
- Gives specific positive feedback concerning performance.
- Provides medals or other awards for performance.
- Criticizes specific performance on tasks, not the individual.

Diagnostic Orientation Cluster

8. Information Gathering†

Behavioral Indicators:

- Asks questions, collects information to understand complaints.
- Receives daily reports to keep abreast of developments in the command.
- Walks around making rounds to find out what's going on in the command (focus is on staff).
- Seeks information in order to plan for change.
- Seeks information from multiple sources to deal with immediate needs.

9. Cause-and-Effect Reasoning†

Behavioral Indicators:

- Considers alternatives before making decisions.
- Articulates consequences of actions in advance.
- Identifies second-order benefits or problems of a situation.

Influencing Cluster

10. Uses Influence Strategies†

Behavioral Indicators:

- Plans arguments and/or tailors presentations to fit audience and objectives.
- Attempts to persuade others by appeals to their self-interest.
- Sells ideas by involving others in the decision-making process as an explicit strategy.

11. Pushes the System†

Behavioral Indicators:

- Uses contacts outside chain of command to accomplish objectives.
- Takes repeated actions to get a task accomplished or attain resources in the face of obstacles.
- Takes calculated risks.

*Adapted from Excellence in Navy Medical Department Leadership and Management, McBer & Co, 1984.

**Critical competency

†Threshold competency

ples of specific behaviors discussed during the interviews. Some of the behavioral indicators that constitute the competencies are listed in Table 1. Hence, while any commanding officer would agree that these skills and behaviors are important, outstanding commanding officers treat them as more than mere platitudes; they practice what they preach.

Course Development

Course design began once the competency model was developed. LMET courses are based on the principles developed for adult learning. Unlike many programs that emphasize didactic lectures, the LMET approach emphasizes experimental learning exercises and group discussions relevant to the class participants' real-life experiences.

This was accomplished by using the job task inventory, described earlier, as well as the expert panel data and interview data, to identify key tasks and situations that commanding officers of health care facilities are likely to face. Realistic exercises were created to reflect these tasks and situations. Class members in groups worked through the exercises and applied the competencies to enhance their performance of the tasks.

In addition to discussing the competencies vis-a-vis their own job experiences, class members role play Captain's Mast cases, Captain's Calls, write command policy speeches and fitness reports, and engage in many other activities a commanding officer is expected to perform. Each aspect of the course also contains self-assessment and group feedback on performance. It is important to reiterate that, except for presentations by flag officers, a lecture on JCAH procedures, and another on resource management, there is little in the course that resembles the straight lecture or "data dump" approach followed by many other short courses.

Finally, the Medical Command LMET course is unique from other Medical Department courses in

another significant way. A major premise is that the instructors must themselves have served as outstanding officers (or enlisted) in the position their course is concerned with. Thus, the two senior instructors who led the recent Medical Command courses were themselves the embodiment of the outstanding commanding officer. Both had received large numbers of nominations as outstanding CO's by the expert panel members and by their peers. Both are captains; one has had two previous commands, the other was, and still is, the commanding officer of one of the largest medical facilities in the Navy.

The risk taken by the Surgeon General and the Commander, Naval Medical Command in assigning those two as senior instructors was not insignificant. Both instructors devoted several weeks away from their regular jobs preparing to teach the course. Nevertheless, calculated high risks in the pursuit of high gains are sometimes needed. In this instance the result was worth the risk. The instructors' credibility and knowledge and their ability to relate the competencies and exercises to their own experience combined to make the difference between a good course and truly great one. More important to the LMET program was the demonstrated effectiveness of such instructors, and the commitment to continue identifying and assigning other outstanding representatives to teach future courses.

LMET Phase II

Because of LMET's success, the Surgeon General has approved the development of two more courses: a senior LMET course and one at the intermediate level. The senior course will be aimed at OIC's, directors of hospital services, heads of major departments (i.e., two or more divisions), and other managers who are 0-5's and above. The intermediate level will focus on heads of smaller departments, division officers, and other supervisors who are 0-4's and below. When these are completed in FY86, a

full complement of LMET courses will be available (see Figure 1).

Conclusion

Training courses alone, of course, are neither the total answer nor are they our ultimate goal. We are working to develop an *integrated* system of courses and key assignments that correspond to critical points throughout one's career. In this regard, AQD's (Additional Qualification Designator) for executive medicine corresponding to the levels noted in Figure 1 based

on both training and experience have been developed. The Medical Department's Management Development Advisory Board has initiated billet reviews, career planning guidelines, and other actions. These efforts will provide the foundation for a norm of excellence in Medical Department leadership.

References

1. LaRocco JM: Leadership and management. *US Nav Med* 75(2):8-11, Mar-Apr 1984.
2. Ibid., pp 10-11. □

TABLE 1 (con.)

Image of Command Cluster

12. Concern for Image of Command**

Behavioral Indicators:

- Sees personal appearance or behavior of self/staff as reflecting on command.
- Makes specific efforts to tell others of command mission or philosophy.
- Explicitly recognizes that command image is affected by patients' experience of quality of care.

13. Managing the Values of the Organization**

Behavioral Indicators:

- Demonstrates concern for equity.
- States an understanding of the impact of command actions on the command.

Representation of Command Cluster

14. Supports the Fleet†

Behavioral Indicators

- Initiates and supports programs that give priority to fleet needs.
- Explains the specific links between care and combat readiness.

15. Public Relations**

Behavioral Indicators:

- Initiates or acknowledges importance of meetings with others as a representative of command.
- Spends time being visible to Navy communities.
- Participates in community charitable or social activities.
- States awareness of necessity to build ties and networks with a variety of communities.

*Adapted from Excellence in Navy Medical Department Leadership and Management, McBer & Co, 1984.

**Critical competency

†Threshold competency

Inflight CPR Platform in the C-9 Aircraft

AE-2 Steven A. McClure, USN
LCDR Patrick E. Olson, MC, USNR

The rate of successful resuscitation of cardiorespiratory arrest in commercial aircraft has long been recognized as dismally low. The reasons for this are: Lack of on-board medication, relative difficulty of obtaining vital signs, delay in reaching definitive care facilities, lack of aircrew or bystander training, and equipment and workspace limitations. Anecdotal information abounds of attempted basic life support efforts in aisles, galleys, and reclining passenger seats.

Successful one- and two-man CPR depends heavily on correct rescuer positioning, victim head- and neck-positioning, and solid back platform for sternal compressions. Use of aisles is undesirable from the standpoint of rescuer posture and movement restriction. Use of galley deck is better but severely impedes crew and passenger access/egress. Use of a semi-reclined seating posture is unsatisfactory for want of backboard, as well as the elevation compromise of carotid perfusion.

The procedure we wish to describe is as follows:

- Two consecutive aisle seats are vacated. This is probably, though not

necessarily, near the middle of the aircraft to permit continued aisle access to restrooms, galleys, crew compartment. Port side seats are superior because of easier emergency oxygen nipple-fitting access.

- Both seats are reclined fully forward in their maintenance/disassembly position.
- A section of galley door or life raft door is lodged between the food tray of the forward seat and seat back of the aft seat. (In the aircraft we have examined, these doors are readily dismantled as a maintenance feature.)* The platform thus derived is roughly knee height to the rescuer, reinforced aluminum, 45 cm across. Roughly 10° of cervical hyperextension is automatically provided. By test, the platform supports 90 kg and is remarkably resistant to fore-and-aft and lateral subluxation. It is most rigid and flat at the location it needs to be, i.e., in the supine victim's thoracic spine region.
- An oxygen pocket mask is connected to the cabin first-aid oxygen nipple-fitting, along the overhead above the forward seat. Tubing should be sufficient to reach the seat back (approximately 1 m). The only additional equipment we suggest is:

- A laminated 3x5 card to be posted in the galley section with a velcro attachment, listing American Heart Association accepted procedures for one- and two-man CPR.

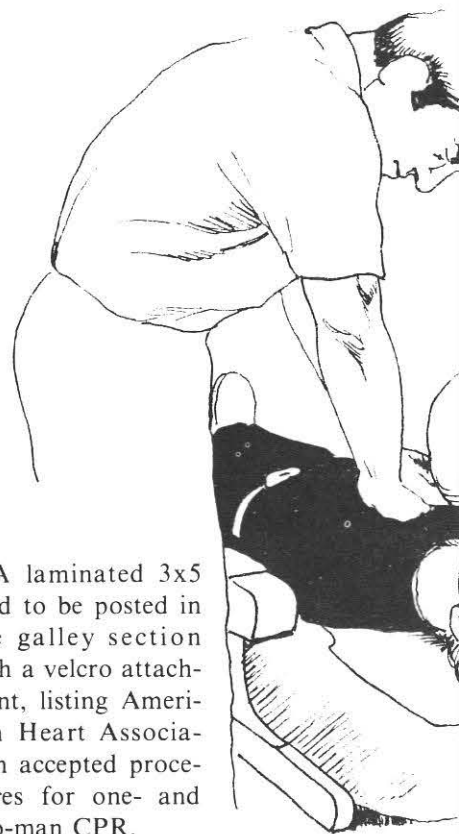
- A Laerdal pocket mask to be attached to oxygen tubing in substitution for the existing diluter/demand rebreather mask. This would allow administration of 100 percent oxygen at approximately 3 liters/minute to the arrest victim. No cutting, fitting, or other modification is required.

We have described a simple and effective method to facilitate one- and two-man CPR in Navy C-9 aircraft. Further investigation should reveal equally simple devices in other large aircraft. Aside from the current controversies surrounding equipping aircraft with cardiac drugs, airway management capability, or merely stethoscopes and blood pressure cuffs, our proposed modification should result in significantly enhanced life support capability at truly minimal cost.** □

When this article was written, AE-2 McClure was assigned to VR-61 at NAS Whidbey Island. Dr. Olson is Naval Air Reserve flight surgeon at NAS Whidbey Island, WA 98278 and is assigned to the Naval Hospital Oak Harbor.

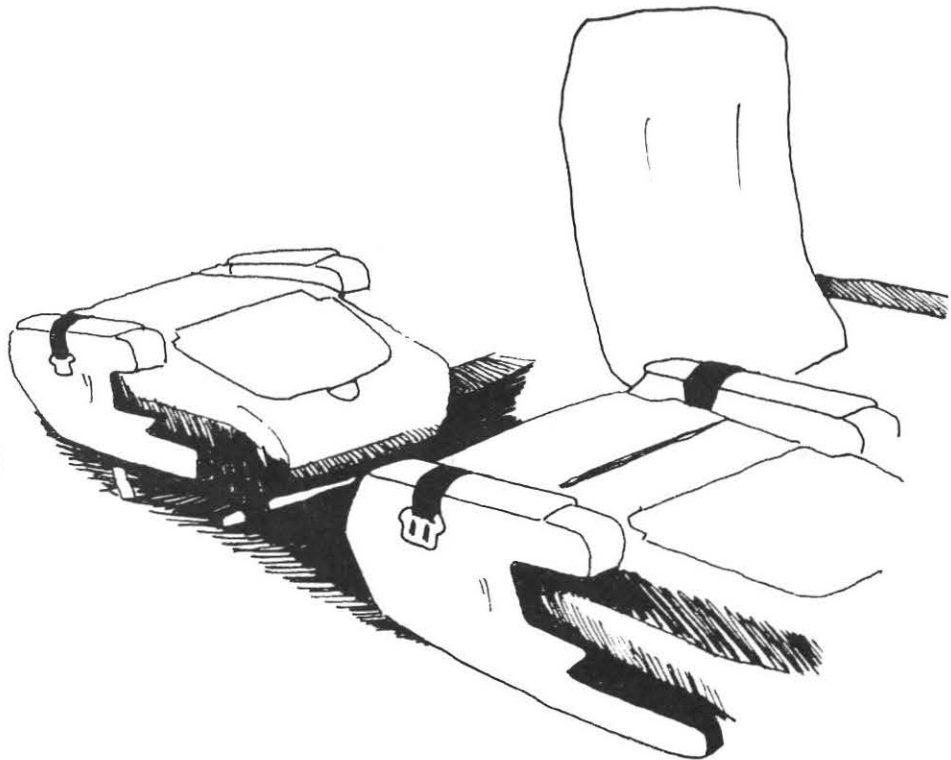
*C-9 aircraft assets of two west coast VR squadrons were examined, representing differing dates of manufacture and delivery.

**Squadron NATOPS and training officers should examine their aircraft to determine safe and effective application in their assets. Differing subcontractors, modifications, and retrofits may make method difficult or unsuitable.

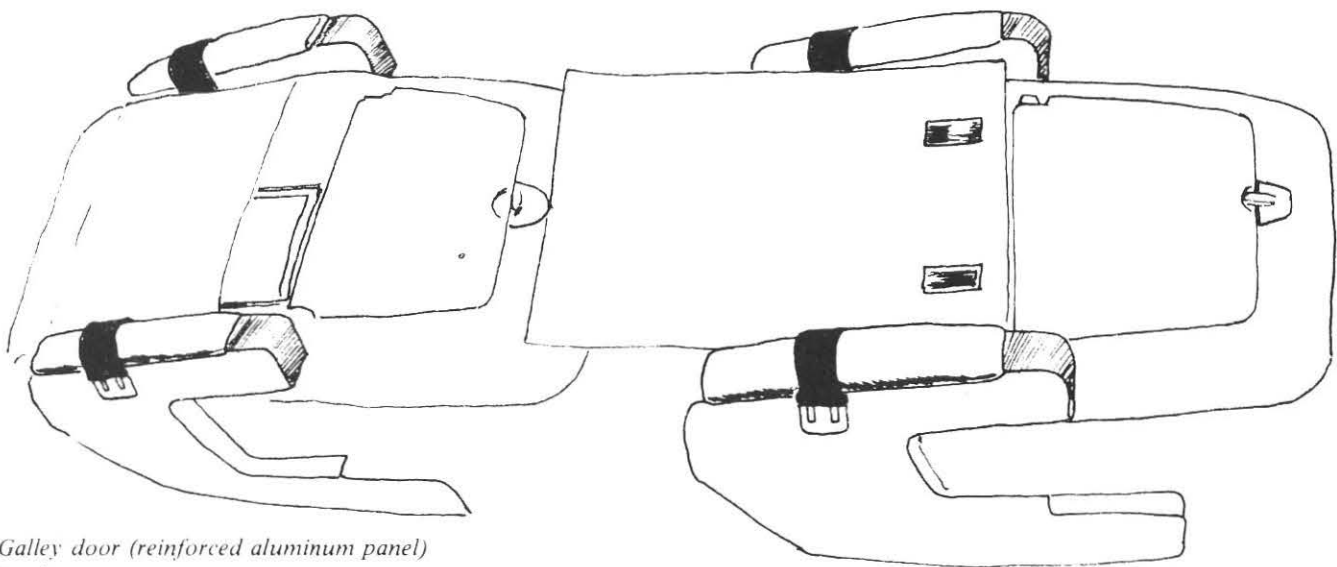




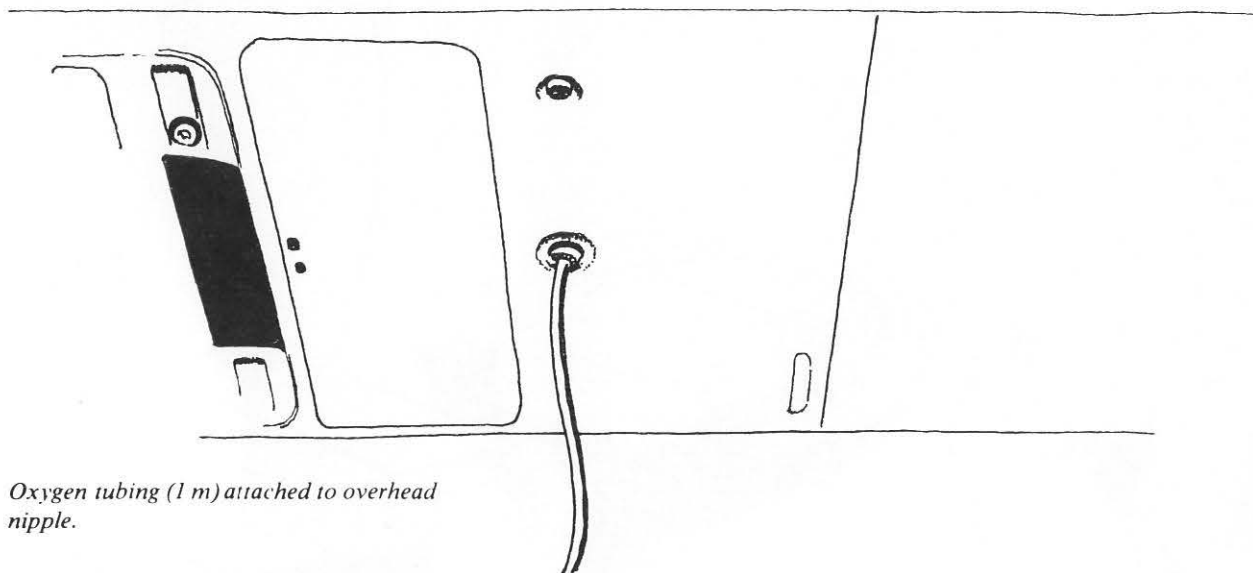
Without platform: Attempted CPR administration in aisle showing unsatisfactory positioning of Resusci-Annie and rescuers (also total aisle traffic obstruction).



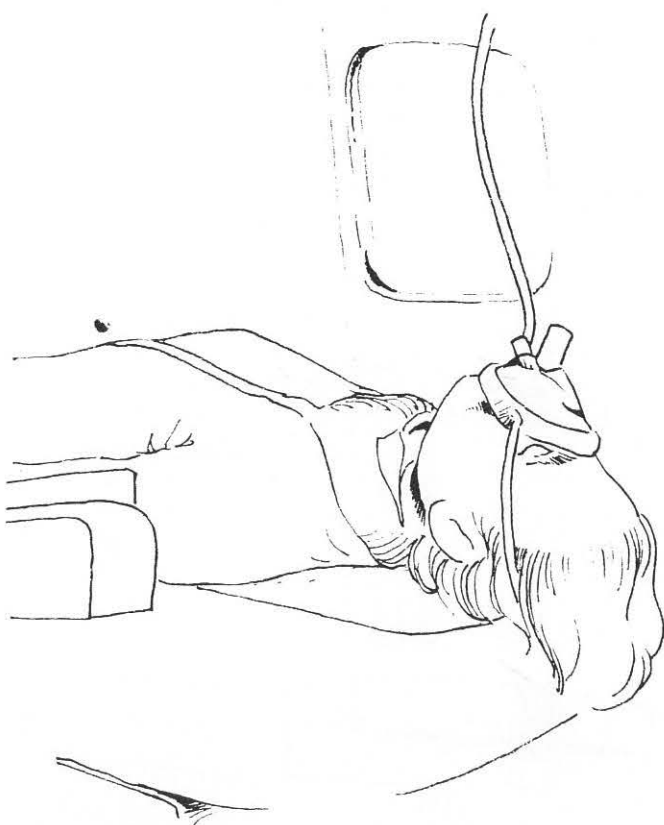
Maintenance position of seats, portside aft cabin.



Galley door (reinforced aluminum panel) in place.



Oxygen tubing (1 m) attached to overhead nipple.



Resusci-Annie properly positioned, showing automatic cervical hyperextension (jaw jut) with airway clear. Laerdal pocket mask is in place in lieu of dilutor/demand mask.



With platform in place: One-man resuscitation effort in progress, showing freedom of movement and proper positioning.

Hose Diving

"Good morning, Sir. I'm sorry to wake you up, but the Admiral's aide just called and they're bringing a man in from one of the provinces . . . they say that he was shell-diving yesterday and is now paralyzed from the waist down . . . Yes, sir; I'll call the rest of the crew in and get the chamber ready . . . Why do these always happen on weekends?"

That became an all too familiar call during my 2 years of duty in Subic Bay, Philippines. I was the diving medical officer responsible for recompression and hyperbaric oxygen treatments with the recompression chamber at the Ship Repair Facility. Since this was the only chamber in the Philippines, most of our patients were civilian shell divers or spear fishermen. We amassed a total of 52 treatments over the 2 years and their histories were consistent and predictable.

An ingenious and resourceful people, these "commercial divers" built their own outrigger boats out of plywood and bamboo nailed in place and laced together with nylon line. These "banca boats" are powered by a small horsepower engine with a direct drive propeller, steered with a small rudder, and are very stable, often taken into open ocean. Their speed is maintained by keeping tension on a nylon string attached to the engine's throttle lever.

Even more interesting is their diving equipment. A small air compressor (usually an old refrigerator compressor designed to pump freon, not air) is attached to the boat's engine and a long rubber hose is used to supply air to the divers. Since they lack modern div-

ing equipment, the hose doubles as their depth gauge; they know how deep they have gone by the length of hose used to get there.

I was initially surprised when told that some of our chamber patients said that they had dived to 40 fathoms. I thought they meant 40 feet or 40 yards—but surely not 40 fathoms! But, alas, they knew that a fathom was 6 feet and they had, indeed, dived to the depth claimed. The record was a dive to 270 feet (45 fathoms) for 90 minutes!

The other end of the hose is tied around the diver's waist and the open end is held between clenched teeth, constantly bubbling air into the diver's mouth as he fishes or looks for shells. If more than one diver uses the same hose, the hose is placed under a convenient rock and each diver returns to it as he feels the need. As unusual as this system seems, it usually works quite well—once one gets used to it.

The divers had never heard of depth or time restrictions to prevent the bends (decompression sickness) and, consequently, we saw many patients with central nervous system bends, usually displaying paraplegia from the T10 level distally with bladder and bowel dysfunction. Most of them obtained relief with a few recompression treatments although some had residual difficulty with plantar proprioception, diminished muscle strength, and bladder dysfunction. One patient required a saturation treatment where both the patient and the medical attendant remained in the chamber for 46 hours.

The most interesting presentation was a man in his teens who was brought in by his uncle who

explained that the nephew was an apprentice and hadn't learned the correct diving method to avoid the bends. The patient was paralyzed from the waist and had not voided in the nearly 30 hours since the onset of symptoms. The uncle explained that, as I no doubt already knew, the best method for avoiding the bends was to ascend while holding one's breath and intermittently stop when there was a feeling of tightness in the chest. I wondered why this man hadn't had a gas embolism or pneumothorax yet. Two weeks later the uncle presented unconscious, in spinal shock, with a pneumothorax. He was successfully resuscitated and walked out of the chamber 6 hours after he arrived! The nephew wasn't as lucky; because of the delay in treatment, marked residual leg weakness and the neurogenic bladder remained.

Some presented with paralysis or other serious symptoms which were days old; they delayed because "the paralysis went away within a couple of days the other times!" So many of the bends cases are never treated. In fact, there is a feeling among the divers that even if you can't dive anymore (because of residual leg paralysis), then you can still steer the boat. Some of our patients were repeat visitors. They seemed to find comfort in the friendly and familiar faces of the chamber crew. There are so many shell divers and diving fishermen that widespread education is impossible. Diving for fish and shells is their livelihood and safety is a distant secondary consideration.

"Hey Doc, I know it's Christmas but we just got a call . . ."

Artist for the President

The paintings of CDR Samuel Bookatz, USNR (Ret.), hang in noted galleries and public buildings throughout the country—the Corcoran Gallery of Art, the Phillips Gallery, the Joseph H. Hirshhorn Museum, the Smithsonian Institution, the Cleveland Museum of Art, the Rochester Museum of Art, the Library of Congress, the Franklin D. Roosevelt Memorial Library, the Naval Hospital, Bethesda, the Armed Forces Medical Museum, and the White House, to name but a few.

His career as an artist spans almost 50 years and, even though he retired from the Navy, he is by no means retired. In fact, Bookatz maintains two studios, one in the Georgetown section of Washington, DC, and another in suburban McLean, VA. He has always been a prolific painter and both his studios bulge with hundreds of portraits and sketches—still lifes and studies of the human form, some hard-edged, abstract, and splashed with rich color, others painted in the realistic style.

The casually dressed man with white hair and bushy eyebrows reminisces about his career in a gentle voice. The dark, piercing eyes are not always so; they seem to change like the style of his paintings, growing more animated as he peels back the pages of his life to recall memorable events. There was the time as a student he had a one-man show in Rome and King Victor Emmanuel honored him by attending. And another episode, also in pre-World War II Rome, when the Italian police arrested him as he sketched Mussolini and Hitler passing in a motorcade. On one occasion he was thrown off a train after defending a young Jewish refugee from a Nazi guard's harassment.



CDR Bookatz at work

As the Germans marched into France in 1940, Bookatz left Europe to face an uncertain future at home as America prepared for war.

Back in Cleveland, his hometown, Bookatz continued painting. Luck, timing, and an influential friend landed him a commission in the Navy with a most prestigious duty station—the White House. His assignment was to document on canvas the Medical Department's contribution to the war effort. Those he met during his Navy career and what he experienced along the way is the subject of the following interview.

USNM: How long have you been an artist?

CDR Bookatz: I've been painting since childhood. I grew up in Cleveland. In those early years my brother was a young surgeon and often I would go to the hospital where he worked and draw what I saw. After graduating from the Cleveland School of Art I studied in Boston with a very famous Russian painter, Alexander Yacovleff. I also learned anatomy at Harvard and then won the William Page Award,

which enabled me to study in Europe. While there I continued anatomy at the University of London.

How long were you in Europe?

From 1937 to 1940. I was there when the war broke out. As a matter of fact, I was in Paris when Hitler was on the outskirts of the city. Secretary of State [Cordell] Hull actually got me out.

I understand that Europe provided you with some interesting experiences.

Because I was an art student and a Prix de Rome mention, I was invited to receptions where Mussolini, Hitler, and also King Victor Emmanuel were present. At one such party I was permitted to pass through all but one of the police lines. The police in the third line pulled at me with such force that they tore the sleeve from my jacket. On another occasion, I attended a parade in which thousands of Italians turned out to greet the Duce. I knew my way around the narrow streets to get to where he used to make speeches on a balcony outside the palace. I edged myself close to the front of the crowd just as Mussolini, Hitler, and the King arrived. As I sat down in a window alcove to sketch, the police arrested me. It had nothing to do with my drawing. The police said I had dishonored the Duce by sitting down in his presence.

I was arrested a number of other times. Once, when returning to my Paris studio from Budapest, there was an incident at the Yugoslav border. A young lad about 9 years old was sitting on the train in front of me. Jewish parents at that time tried to save their children by sending them out of Germany. One of the guards came up and called for our passports. He asked the little boy where he was going and then

took his suitcase, emptied the contents on the floor, and wiped his feet on each piece of clothing. The guard then told the boy to follow him. It really got to me. I said, "Why don't you leave the boy alone, he's not doing any harm." They stopped the train and threw me off. When you're young like I was you don't think of the consequences.

Once, a few of us painters decided to go to Spain. While we were in Marseilles the French police detained us. That same night the French ship *Paris* had burned at its dock. It was thought to have been sabotaged. The police came to our room and took us to the police station, where we were questioned. They released me and told me to return the following day for more interrogation. I knew this could be a lot of trouble so decided not to go back. Instead, I went to a nearby village and bribed the mayor. He stamped my papers and I bicycled on to Paris and subsequently got out of France on one of the last American ships to leave.

How did you end up in the Navy?

That's an interesting story. I came back to Cleveland from Europe and after getting resettled began doing a portrait of David Dietz,* one of President Roosevelt's advisors. At that time, 1941, I knew I was about to be inducted. Dietz told me he was going to Washington the next day to see the President. "How would you like to be in the Navy?," he asked. I said that would be great. He returned a few days later and said, "Sam, you're in the Navy."

Didn't it seem strange to be joining the Navy as a painter?

No. Roosevelt was looking for a good artist to record medical history. One day I was a civilian, the next day I was a lieutenant (jg). Dietz then asked me to come to Washington to meet the Surgeon General [VADM Ross T. McIntire], which I did.

What was your first assignment?

The White House. It was the most fabulous thing you can imagine. I sketched the President and began the portrait of Dr. McIntire, who was Roosevelt's personal physician. I still have sketches of Eleanor and the President.

How many sittings were required to complete an oil portrait?

My portrait of Dr. McIntire took about 50 to 60 sittings, each one lasting about 2 hours without interruption. My subjects would leave their uniform coats with me. I had a manikin which I'd put the coat on, but it still took 50 to 60 sittings for the face and hands. The great portraitist, John Singer Sargent, demanded at least 200. In a good portrait there are thousands of brushstrokes, one color over another to get skin tones and light values.

What was Washington like when you arrived in 1942?

It was little town with perhaps

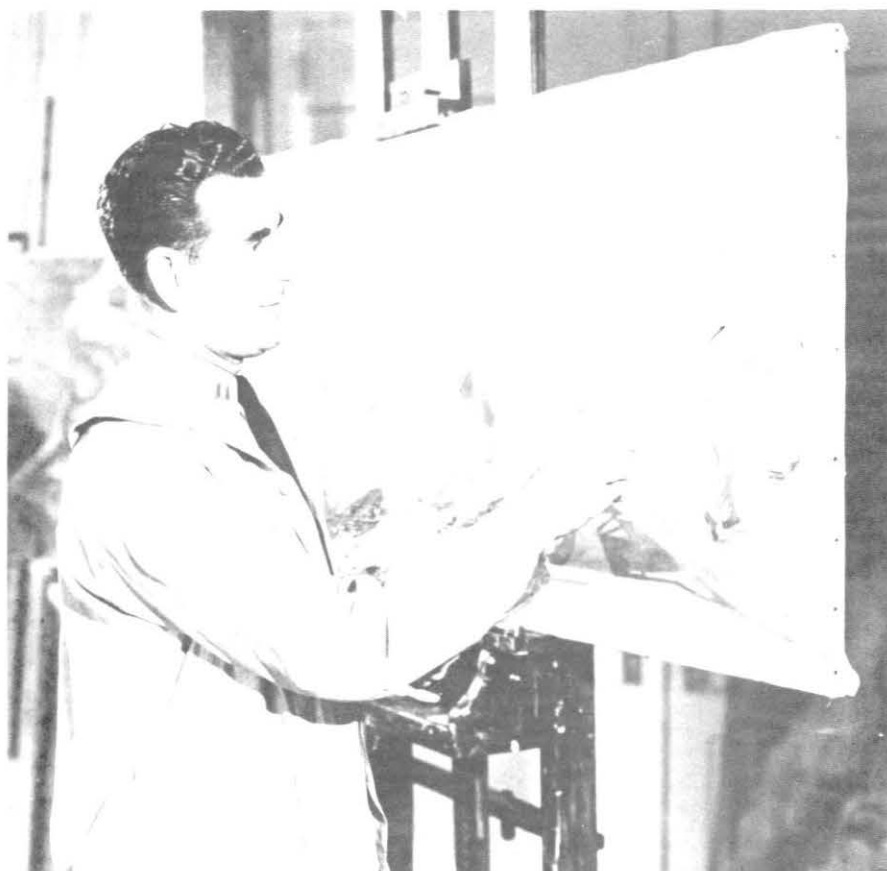
200,000 people. With the influx of military, you just couldn't get a room. I finally moved into a little room at a boarding house at 21st and P Streets. Because I wasn't too clear as to what corps I was in, the uniform shop had sewn the physicians' oak leaves on my sleeves. When the Surgeon General saw my uniform, he exploded. "Take those oak leaves off; you're not a doctor." So I went back to my room, cut them off, and laid them on the dresser. The old lady who ran the boarding house used to make up my room. One day she saw my insignia on the dresser, called the FBI, and told them she had a spy living in her house. Two agents showed up and began questioning me as to where I worked. I was under orders not to tell anyone where I worked. I told them to call the Surgeon General and he would explain everything, which he did. He told me to get out of that house immediately.

Did you spend all your time at the White House?

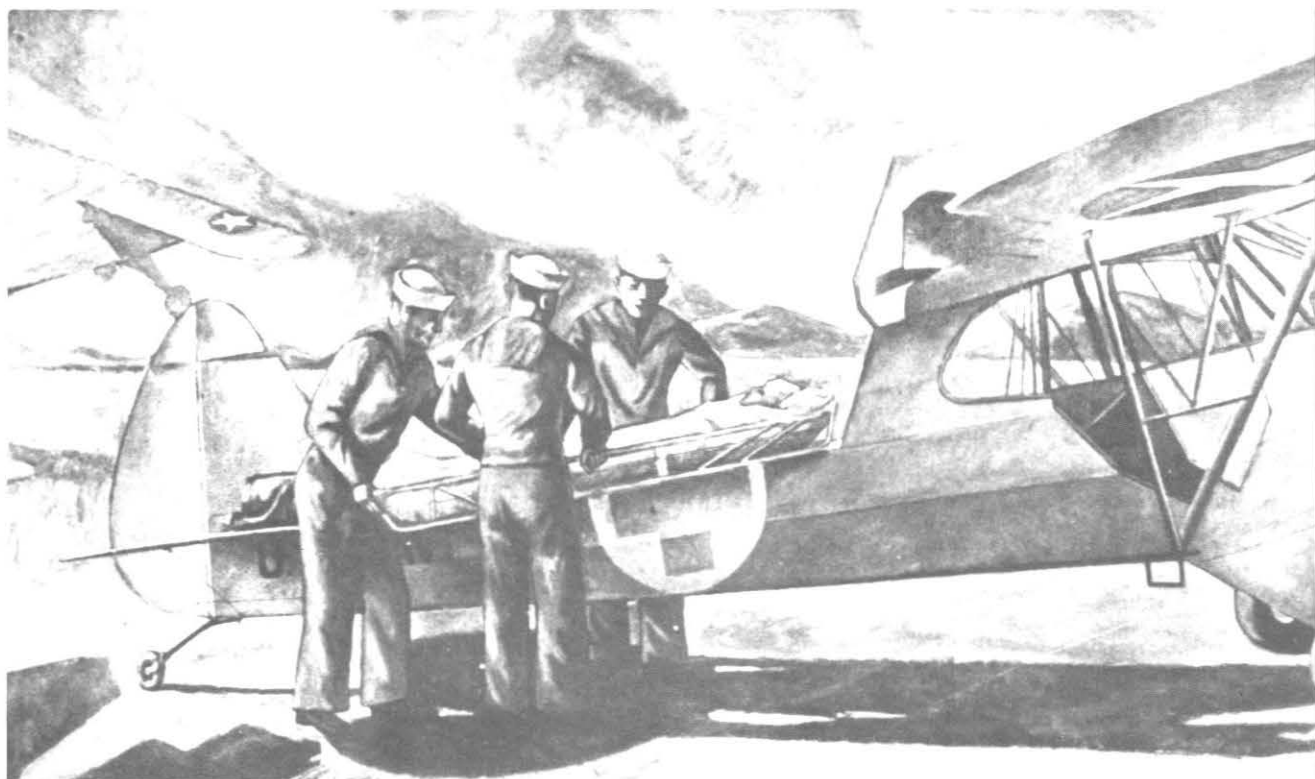


King of Italy, Victor Emmanuel (center) and Samuel Bookatz (far left) at the painter's one-man show in Rome, 1938.

*Dietz, famous author and science editor, was then serving on the National Research Council as a consultant to the Surgeon General of the Army, and advisor to the President.



At work in his studio in the old Washington Naval Hospital, LT Bookatz adds another brushstroke to his painting of a Piper Cub ambulance plane. Below: The completed product.





Left: In this wartime painting, Navymen signal the hospital ship USS Solace.

several hospital ships I painted to be hung over one of the White House fireplaces.

Were you assigned to the White House through the war years?

No. In 1945 I was assigned to plastic surgery at Oak Knoll in Oakland.

Plastic surgery?

Yes. I worked with some of the greatest surgeons in the world. I cut cartilage for facial reconstruction right in the operating room.

You did this without a medical degree?

Yes. The surgeons were so busy, they would ask me to cut a piece of cartilage for a nose or other portion of the face. An artist knows proportions. I certainly knew anatomy, having studied both at Harvard and in London.

What did you do after the war?

I had been in the Hospital Corps and after Roosevelt died they made me a line officer. I was called back to active duty during Korea to paint and help out in reconstructive surgery. They gave me a studio at Bethesda, where I painted murals with historical themes and portraits of the Surgeons General. I can't overemphasize how important my knowledge of anatomy was. Nowadays, young artists don't get many years' training in anatomy. They want to throw paint and splash around. The whole social attitude toward artists seems to have changed. I often wonder if I would still be willing to go through all that tough training.

How did you assist in the OR?

Besides assisting in surgery I would do sketches of the patients as the operation proceeded.

I don't understand why they needed an artist. Wouldn't photography have been quicker and more practical?

No. I had another studio in the former operating room at the old Naval Hospital at 23rd and E Streets.

Where was your White House studio?

The Lincoln Bedroom. I had to paint in a corner of the room to get the best light. It was an interesting place to work all right. Mrs. Roosevelt used to write her newspaper column "My Day" right next door. Often, I would hear her old typewriter clacking away and it would disturb me but, of course, I couldn't say anything. When I was through for the day, I would wash my brushes in the White House sinks.

Did you ever do any painting for the President?

I did two large western mountain scenes that the President liked. When Truman arrived they came down. He had his own painter. There were also





Left: "Death March" illustrates the grim determination of men carrying a wounded comrade to safety. Below: Bookatz painted this mural depicting corpsmen at work for the Hospital Corps School in Portsmouth, VA.

In those days photographic equipment was big and bulky. And, you needed large lamps. When photographers tried to bring it all into the operating room the surgeons would scream, "Get those damn things out of here, they're not sterile." We didn't have small cameras 40 years ago. I could get up very close and make detailed sketches. The drawings, made on the spot, could then be photographed and projected on a screen. The surgeons would have their conference and then go out and perhaps save the next badly injured patient.

The doctors would allow me to help in other ways. I'd talk with the wounded boys and try to cheer them up. I remember one kid very well. He had half his face blown away and

didn't want to see anyone. I'd sit and talk with him. He would show me pictures of what he looked like before. After each operation to rebuild his face, I would redraw him. I went to his wedding at the chapel and it was the happiest event you can imagine.

When did your Navy career end?

After Korea. They wanted me back for Vietnam but I decided to sit that one out.

I notice a lot of your painting is abstract. When did you begin doing this kind of painting?

I've always done it, even before I went into realism. It wasn't always accepted in those years. I was trained as a realist, but now much of what I paint is abstract—murals and frescoes. I just completed eight frescoes for the lobby of a condominium in Arlington, VA, and may do a mural for the Ramada Inn.

What about portraits?

I don't do many anymore. If the sitter doesn't interest me, I won't paint him. It's nice to be in a position where I can say that.

The term combat artist or war artist has always struck me as a contradiction in terms. During your Navy career you were considered to be a combat artist, yet talking about war and art in the same breath seems to me to be a desecration of the word art.

Look at Goya, the great Spanish artist. His murals about war hang in the Prado. His canvases run with blood yet there's beauty there also. What's more breathtaking than a Rubens depicting the crucifixion? Look at Picasso's Guernica! What is depicted on that canvas is horrifying, yet beautiful at the same time. The artist sees beauty in everything. I've always preached that one can find beauty in ugliness; there's even beauty in the anatomical shape of an internal organ.

Have your work habits undergone drastic changes over the years?

Not really. As an artist you are always creating in your mind. If you're not working you are creating, still looking. If you are good you know your work will last somewhere and be appreciated. It's been a beautiful profession. —JKH



Studies of President and Mrs. Roosevelt drawn during the artist's White House years.

Erythema Multiforme

Diagnosis and Treatment

CDR C.D. Ferguson, DC, USN CDR G.M. Taybos, DC, USN

Erythema multiforme is an acute, non-specific inflammatory disorder characterized by self-limiting skin and mucous membrane eruptions. Although primarily a cutaneous disorder, it can have oral manifestations that may occur concomitantly or independently of skin lesions.(1,2)

Clinical Features

Erythema multiforme may be seen at any age; however, it has a greater propensity for young adults. The onset of the eruption is rapid (12-24 hours), at times associated with a fever, symptoms of respiratory tract infection, and muscular aches. The lesions are variable in size, rarely exceeding 2 cm in diameter, with complete resolution ranging in time from 7 to 10 days to a few weeks. Many of those afflicted with erythema multiforme can be expected to have recurrent attacks at regular intervals, especially during spring and autumn. This seasonal variation is presumably due to individual susceptibility at certain times of the year to etiologic agents such as adenoviruses, mycoplasma, herpesvirus, or deep fungi.(3-6)

The symmetrical distribution of cutaneous lesions may vary from erythematous macules, papules, vesicles,

to bullae. Any cutaneous area may be affected; however, the lesions are more prominent around the wrists, ankles, knees, elbows, hands, feet, and face. Hemorrhage into the affected areas is commonly characterized by focal, target, iris, or bull's-eye lesions. The iris or target lesion is a variable feature, but nonetheless it is considered pathognomonic for erythema multiforme. Target lesions, found exclusively on skin, are characteristically absent when oral lesions predominate.(7,8)

The oral lesions of erythema multiforme may prove to be a diagnostic challenge since the clinical manifestations vary according to the stage of the disease. The lesions undergo a rapid progression from a macular to the bullous stage, resulting in the formation of large irregularly shaped ulcerations covered by a white pseudomembrane that can be wiped off, leaving a raw tissue base. Intraoral sites primarily affected are the buccal mucosa, tongue, palate, and lips. Gingival involvement is rare. The lip lesions may occur as large irregular ulcers covered with grayish necrotic tags of epithelium. Frequently, a sanguinous crusting may develop that is sufficiently unique to be considered pathognomonic for erythema multiforme.(3,9,10)

Stevens-Johnson syndrome is a more severe and sometimes fatal form of erythema multiforme that is characterized by extensive involvement of the

mucous membranes. There are extensive bullous eruptions that affect the mouth, skin, eyes, and genitalia. The onset is marked by a high fever, headache, malaise, and symptoms suggestive of an upper respiratory tract infection. The disease initially may involve the oral and perioral structures, and it eventually results in a severe stomatitis. Involvement of the eyes can result in blindness due to scarring of the cornea.(8,11-13)

Diagnostic Considerations

The exact nature of erythema multiforme is unknown. There is evidence the IgM immune complexes accumulate in the vessel walls of the papillary dermis.(14) The histopathology reveals a nonspecific inflammatory change; however, the connective tissue and epithelial changes are unique so as to rule out other microscopically diagnosable conditions that have similar clinical features.(15)

Multiple etiologic and provoking agents have been recognized and must be considered in the diagnostic process.

Drugs: Almost any drug can cause erythema multiforme. The drugs most often associated with it are penicillin,(3,16) long-acting sulfonamides,(17-18) salicylates, digitalis, Dilantin,(19) gold salts, hydralazine, iodides, mercurials, isoniazid,(20) and birth control pills.

Infections: The herpes simplex virus has received the most attention be-

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cause erythema multiforme tends to follow such attacks in a large number of well-documented cases.(21,22) Shelley(23) was able to induce erythema multiforme following intradermal injections of killed herpesvirus. *Mycoplasma pneumoniae* has been shown to have a significant association with erythema multiforme even in the absence of clinical evidence of pneumonia.(24) Other infections implicated in erythema multiforme are tuberculosis, typhoid fever, mumps, measles, Coxsackie virus, histoplasmosis, coccidioidomycosis, malaria, and trichomoniasis.

Immunizations: Erythema multiforme can develop following immunizations for smallpox and polio and BCG inoculations for tuberculosis.

Collagen disease: It is not uncommon to have erythema multiforme associated with lupus erythematosus.

Internal malignant disease: Lymphoma, Hodgkin's disease, myeloma, and internal malignancies have been associated with erythema multiforme.

Radiation therapy: The treatment of internal malignancies with X-radiation has, at times, induced erythema multiforme.

Pregnancy: Erythema multiforme has occurred in some women during the latter half of pregnancy and has ended with parturition.

Other diseases: Crohn's disease, Addison's disease, and sarcoidosis appear to be related to erythema multiforme.

Idiopathic causes: In one large study, 50 percent of the cases of erythema multiforme had unknown etiologies.(25)

Therapeutic Management

The treatment for erythema multiforme depends on the severity of the disease, but it is primarily supportive. Rinsing with either topical anesthetics or antihistamines before meals

decreases the discomfort encountered by the patient during mastication and thus allows for adequate food intake. Topical rinses of corticosteroids may alleviate some of the symptoms. Use of antiseptic mouthwashes can reduce the incidence of secondary infection.

Topical Anesthetic Agents

Rx

Lidocaine hydrochloride viscous, 2 percent

Disp: 100 (450) ml bottle

Sig: Rinse with 1 tablespoonful before each meal, full strength or diluted to 1/3 or 1/2 strength.

Rx

Diphenhydramine hydrochloride elixir, 12.5 mg/5 ml

Disp: 4 oz bottle

Sig: Rinse with 1 tablespoonful for 2 minutes before each meal.

Rx

Benzocaine aerosol spray, 20 percent

Disp: 2 oz can

Sig: Spray oral lesions before each meal.

Antiseptic Mouthwash

Rx

Providone-iodine mouthwash, 0.8 percent

Disp: 4 oz bottle

Sig: Rinse with 1 tablespoonful after each meal and at bedtime.

Corticosteroid Rinse

Rx

Dexamethasone, 0.5 mg/5 ml

Disp: 100 ml bottle

Sig: Rinse with 1-2 teaspoonsful 4 times a day for 2 minutes.

The use of systemic steroids for treatment of erythema multiforme is controversial; yet a tapered low-dose and short-term regimen of prednisone (50-80 mg daily) has produced dra-

matic resolution of the disease without the undesirable side-effects associated with long-term steroid therapy.(26)

Rx

Prednisone, 10 mg

Disp: 22-24 tablets

Sig: Take 4-8 tablets once a day for 4 days; then decrease by 1-2 tablets for each of the next 3 days.

Levamisole hydrochloride, a veterinary anthelmintic, was used in a small double blind study of 14 patients with oral erythema multiforme.(27) The results were promising. After 2 years all patients reported a reduction in the severity of pain, and most patients experienced a reduction in the duration of symptoms and a longer interval between attacks. Patients with persistent lesions were given 150 mg of levamisole hydrochloride daily for 3 consecutive days at the first appearance of a lesion, with treatment continuing for at least 4 weeks. For patients with recurrent attacks, 100-150 mg of levamisole hydrochloride daily for 2-3 days was enough to abort the attack or reverse the lesions. Side effects were minimal, and these were controlled or eliminated by reducing the dosage or by having the patients take the medicine at bedtime or with meals.

If the disease process is determined to be Stevens-Johnson syndrome, consultation with internal medicine and ophthalmology departments is in order.

Conclusion

Since some 50 percent of the cases of erythema multiforme are idiopathic and the treatment is supportive, a concentrated effort must be made to determine the specific cause of the eruptions. The identification of a specific agent could, upon elimination or avoidance, prevent recurrent episodes.

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Chief Petty Officers "Backbone of the Navy"

Recently, there have been a number of ceremonies marking the "Change of Command" of Command Master Chief Petty Officers within the Medical Department.

Among these have been the ceremonies in July at Naval Hospital Orlando in which HMCM Joseph W. Phillips assumed duty as Command Master Chief from HMCM(SS) Robert W. Clements, in August at the Naval Medical Clinic San Diego in which HMCM Deboise Mitchell assumed his duties from HMCM Hal Anders, and in October at the Naval Medical Command, National Capital Region in Bethesda, MD, where HMCM(SS) Rex E. Henderson took over as Command Master Chief from HMCM Ernest M. Powell, Jr.

These ceremonies, and similar ones preceding them, have been more than events marking the passing of the baton of leadership from one master chief to another. They are a reflection of the special trust and confidence the Com-

mander, Naval Medical Command (COMNAVMECOM) and commanding officers of various medical facilities have in these special people.

In a personal memorandum to commanders, commanding officers, and officers in charge, RADM William M. McDermott, Jr., MC, COMNAVMECOM, gave his views concerning master chief petty officers and also senior chief and chief petty officers as well.

RADM McDermott pointed out that chief petty officers have a record of performance reflecting the trust and position of respect in which they are held. "These are outstanding men and women," he stated, "who provide insights and capabilities for problem solving not found elsewhere. They possess not only the technical expertise of their rating but the managerial expertise associated with their rate."

The commander's message emphasized the tremendous responsibilities faced by these men and women. They



RADM McDermott with HMCM(SS) Clements

manage and provide health care services to active duty dependents, and retired of the Navy and Marine Corps. And, by doing so, the chief petty officers are acknowledged by the Medical Department as being the "Backbone of the Navy."

Emergency Medical Training

Naval Reserve hospital corpsmen recently underwent an intensive specialized emergency medical training program at the Vienna Air Force Reserve Base, Youngtown, OH. Sponsored by the Naval Reserve Readiness Command Region Five, headquartered in Ravenna, OH, the course, held during the last week of September and the first week of August, leads to national certification as an emergency medical technician.

The curriculum included both classroom study and practical experience in basic life support, cardiopulmonary resuscitation (CPR), proper handling of a wide variety of injuries to various parts of the body, emergency childbirth, and fractures of the back and extremities.

With the volunteer assistance of Gold Cross Ambulance Service of Salem, OH, the Naval Reserve medical personnel receive instruction in lifting victims in and out of an ambulance, monitoring vital signs while underway to a medical facility, and use of equipment stocked by ambulances.

The Vienna air base fire department provided training in freeing victims from wrecked vehicles. This phase of the training program included actual use of various tools for quickly and safely cutting apart damaged vehicles to rescue trapped victims. Wrecked cars were provided by the fire department for this purpose.

The thirteen reservists taking the course were from Naval Reserve cen-

ters in Akron, Cincinnati, Columbus, and Toledo, OH; Altoona and McKeesport, PA; Rochester, NY; and Las Vegas, NV. The number of students was limited in order to provide the best possible instruction for each individual.

The course was coordinated by HMCS Robert Hansen, a reservist who drills with Naval Reserve Naval Hospital Portsmouth Unit 1105, at the Naval and Marine Corps Reserve Center Toledo. This was the fourth such course put together by Hansen, and the second to be held within Region Five. □

—Naval Reserve Readiness Command Region Five, Ravenna, OH



HN Glenn E. Pritchard simulates an accident victim in deep shock during training in emergency medical techniques. Monitored by HM2 Gary L. Simms, Pritchard is trussed up in a pair of life-saving "shock pants" which inflate to force blood from the victim's lower extremities to the upper body and head to relieve or prevent the symptoms of shock.



HM3 George A. Evans (left), HM2 Orlando Diaz (center), and HN Glenn E. Pritchard have just removed the windshield and cut the top away from a wrecked automobile. Here they rig the "jaws of life" to pull the steering wheel and column away from the chest of a simulated accident victim as part of their training in emergency medical techniques.

Myocardial Revascularization in the Active, Young Adult

CDR Michael Swank, MC, USNR

There are a few current reports on the long-term followup of young patients having had myocardial revascularization.^(1,2,3) Some deal with specific subsets of patients and address the usefulness of coronary artery bypass grafts to relieve angina, improve life style, and prolong life. The availability in the military of a group of relatively young, previously vigorous patients with coronary artery disease provides an opportunity to analyze the outcome of surgically treated patients with regard to continued productivity.

It was the purpose of this study to examine the outcome of this interesting subset of patients regarding relief of angina, life style, and continued service in the military.

Material and Methods

From July 1970 to August 1979 myocardial revascularization was performed on 120 active duty patients in the U.S. Armed Forces. There were 8 early (only one after 1973) and 2 late deaths with 110 survivors remaining for analysis. Detailed questionnaires and letters were sent to 85 patients who were successfully located.

Fifty (58.8 percent) completed the study. Fifteen patients responded but declined to participate in the study. Twenty declined to respond. After the completed questionnaires were ana-

lyzed, further information was obtained from the patients' physicians. This included current clinical status, medications, results of stress testing, recatheterization, and reoperation result if applicable.

The followup time ranged from 15 months to 8 years, with a mean of 42 months. The age range at the time of operation was 28 to 53 years with an average of 38.4 years. All were males on active duty from 6 to 34 years' service. Risk factors are presented in Table 1.

Forty-four sustained a previous myocardial infarction. The patients were grouped according to the New York Heart Association classification as follows: class I, none; class II, 2 percent; class III, 72 percent; class IV, 26 percent. Ventricular function was normal in 64 percent. There was mild ventricular dysfunction (one segment hypo or akinetic) in 31 percent and severe dysfunction in 5 percent.

The number of grafts performed range from one to five with an average of 2.3 grafts per patient. Studies from Emory and St. Louis indicate that patients younger than 40 had 75 percent and 63.5 percent single or double bypass grafts respectively; 44 percent of this group were under age 40.

Operative Procedure

All procedures were performed at the Naval Hospital, Bethesda, MD. Reverse sphenous were used exclusively except in four patients where either the left or right internal mam-

mary artery was used to bypass a left anterior descending artery. No internal mammary arteries were used after 1973. Prior to 1977 myocardial protection consisted of systemic hypothermia and local hypothermia with intermittent crossclamping of the aorta for distal anastomoses. Subsequent to July 1977 cardioplegic arrest, systemic hypothermia (28° C) and local hypothermia were used for myocardial protection.

The operative mortality rate was 6.6 percent prior to 1977 and 3 percent overall. From July 1977 through August 1979 there were no deaths in those 34 patients when cardioplegia was used. The peri-operative infarction rate using EKG and isoenzyme criteria was 6 percent overall and 2 percent since the use of cardioplegia.

Results

Late complications related to operations were reported in two patients. Both developed sternal infection 5 to 6 years later and were successfully treated. Only 25 patients were electively recatheterized at a period from 3 to 30 months with an average of 14 months. Graft patency was noted to be 87 percent. Two patients had late post-operative myocardial infarctions. One of these was successfully reoperated.

Table 2 shows the symptomatic results as ascertained from the questionnaire and the physician contact. Sixty-seven percent were class I or II. Nine percent class III and those with angina were easily controlled with

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medical therapy. The remaining 24 percent were either class III patients that were difficult to control with medical therapy or class IV patients. Six were reoperated for recurrent angina. Four were noted to have progressive disease and two patients were judged to have incomplete revascularization. When asked the impression of results, only 12 percent said they had poor or fair results while others answered good to excellent. Rehabilitation results are shown in Table 3. Twenty-four patients continued on active military duty and another 38 percent were working full time after either retiring or separating from military service. Of those patients not working, 24 percent were active in civic or personal pro-

jects. The remaining 4 percent were sedentary. Eighty-one percent who smoked prior to operation quit post-operatively and have not smoked since.

Discussion

The typical patient in this series is military career-oriented, overweight, and a heavy smoker with a strong family history of coronary artery disease. As compared to other similar series, however, the number of patients with hypertension (25 percent) was low. This probably reflects the initial and subsequent military selection process. Many have single- or double-vessel disease with an almost 50 percent previous infarction rate. This is similar to the Emory and St. Louis experience.^(1,2)

The 6.6 percent operative mortality and 6 percent peri-operative infarction rate is relatively high; however, seven of the eight deaths occurred in the years prior to 1973 when operative procedures, myocardial protection, and anesthesia were still in the formative stages. With the increase in surgical expertise and experience and subsequent use of cardioplegia for myocardial protection, the operative mortality and infarction rate became acceptable.

The difficulty of obtaining followup of patients who subsequently leave the military is evident. We were unable to locate 25 former patients for analysis despite using all resources at hand.

The fact that only 50 cooperated fully is disappointing and reflects again the problems inherent in conducting this kind of study. Personal phone calls and followup letters were not helpful in trying to persuade people to participate. However, we were able to see a trend in regard to return to active work. Sixty-two returned to either unlimited active military careers or full civilian employment. Another 24 percent elected to retire but lead full active lives in their communities. Sloman and Sutton noted that return to work after bypass surgery does not always correlate with surgical outcome.⁽⁵⁾ Although many of this 24 percent could probably continue to work, community and social factors influence this decision. Many patients in this series had 20 years of military service and thus were eligible for retirement benefits. The survey indicated that 20 percent of those that elected to leave the service did so because of this factor alone. Some felt that their careers would be curtailed or modified by the fact that they had heart surgery. If a patient is able to return to a class I or class II status after 6 months limited military duty, there should be continued effort to keep these highly qualified and experienced personnel on active duty.

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TABLE 1. Risk Factors for Coronary Artery Disease

Hypertension	25%
Family History	51%
Smoking	75%
Obesity	51%
Diabetes	10%
Increased Cholesterol	28%
Hyperlipoproteinemia	31%

TABLE 2. Symptomatic Results

Angina Free With Exercise	42%
Angina Only With Vigorous Exercise	25%
Angina Only With Minimal Exercise, Medically Controlled	9%
Reoperated	11%
2 Incomplete Revascularizations	
4 Progressive Disease	

TABLE 3. Employment Status

Active Military Duty	24%
Full-Time Civilian Employment (After Military Retirement)	38%
Retired, Active in Civic and Personal Projects	24%
Sedentary	14%

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